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THE CURRICULUM GAP IN ALLIED HEALTH ENGLISH EDUCATION: A PROGRAMME-DIFFERENTIATED ANALYSIS OF ESP NECESSITY, INSTRUCTIONAL LACK, AND LEARNING DEMAND AMONG PAKISTANI HEALTH SCIENCES STUDENTS

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Abstract

There is increasingly international literature on English as a Specific Purpose (ESP) in the field of health sciences. ESP as a factor in the teaching of various allied health sciences and still largely missing in the literature of Pakistani higher education. This research filled this gap by examining surveys of 309 allied health students who are undertaking five programmes (DPT, Pharm-D, MLT, RIT and HND/Nursing) at Government College University Faisalabad (GCUF), Pakistan. Adopted a quantitative research design. The Hutchinson and Waters (1987) ESP needs analysis framework was utilized. The study used a one-way ANOVA (with pairwise post-hoc comparisons), Pearson correlation analysis, and multiple regression to test: (1) the extent to which a measurable curriculum gap, which is the mean difference between perceived instructional lacks (Section B) and ESP necessities. Findings indicate that the systemic gap in the curriculum between the means scores is Δ = 0.86 units with the largest gap with authentic materials Δ = 0.17 and clinical writing Δ = 0.89. ANOVA supports the significance of the programme effect on the necessity demand in the Section D (F (4,276) = 2.63, p =.035) with the students in HND/Nursing (M = 4.47) and RIT (M = 4.36) having a significantly higher necessity demand compared to DPT students (M = 4.12). The course evaluation (r =.460, p <.001) and self-competence (r =.481, p <.001) have a strong correlation with prior English learning experience. Multiple regression reveals that self-competence (β = +.177, p = .017) and learning preferences (β = +.201, p = .003) are good positive predictors of ESP necessity demand (R 2 =.128). The results provide a programme-specific, empirically-based basis on which differentiated ESP course design can be based to curriculum designers, ESP course developers, and coordinators of allied health programmes at GCUF.

***Keywords*:** ESP curriculum gap, programme-differentiated needs analysis, allied health ESP, necessity-lack gap, Pakistan, GCUF, healthcare English, multiple regression, ANOVA

1. Introduction

The main issue with the English Specific Purposes (ESP) design of the curriculum in health sciences education is not simply to show that students require specialised English teaching, but to be as precise as possible in defining what type of instruction various student groups require, and how the current instruction is failing to address those needs. The given specification problem is acutely complicated in the context of allied health as a single university faculty might include students of the physiotherapy programmes, pharmacy programmes, medical laboratory science programmes, radiological imaging programmes, and nursing programmes, and each of them has rather specific target professional communication environments, genre conventions, and lingo task profiles.

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Studies in health sciences education of existing ESP that have involved analysis have in few cases considered health sciences students as a fairly homogeneous group that combines responses across the programmes and presents global means that can hide significant inter-programme differences. Lopez and Razak (2025) investigated allied health novices in Malaysia but did not further break down by programme. Hekmati et al. (2020) compared stakeholders of students, instructors and practitioners in Iran but in one health sciences faculty. The study by Khan et al. (2024) was the most methodologically similar to the current research but their study has been limited to one programme-based legal context, which does not allow programme-level comparison because the authors employed SPSS-based quantitative ESP needs analysis in their study to analyse 385 Pakistani law undergraduates in Punjab. The comparative programme dimension- and quantification of the curriculum gap as a measurable construct- is a little-explored frontier of analysis in Allied health ESP research.

This study presents three contributions to the analysis, which were not found in the other two articles on this data series. First, it operationalises the curriculum gap as a quantifiable number namely the mean difference (Δ) between scores in Section D necessity (what students need) and the scores in Section B instruction (what they have received), and prioritises curriculum domains in terms of the size of this gap. Second, it uses programme-disaggregated ANOVA and pairwise post-hoc comparisons to determine the significant differences between the demand of ESP necessity among DPT, Pharm-D, MLT, RIT, and HND/Nursing students. Third, it develops a multiple regression model to determine the within-student predictors of ESP necessity demand and the explanatory variables of instructional lack, self-competence and learning preference. Collectively, these examinations represent a methodological development in the literature on the Allied health ESP in Pakistan and the evidence of the differentiated ESP curriculum development within the framework of the program at GCUF.

1.1 Research Questions

The study addresses four research questions not examined in prior analyses of this dataset:

RQ1: How large is the curriculum gap between students' ESP necessity demand (Section D) and the adequacy of their prior English instruction (Section B), and which curriculum domains show the largest gaps?

RQ2: Do ESP necessity demand scores differ significantly across allied health programmes (DPT, Pharm-D, MLT, RIT, HND/Nursing), and which programme comparisons are statistically significant?

RQ3: What is the intercorrelational structure among necessity demand, instructional lacks, professional self-competence, and learning preference, and what do these correlations reveal about the construct relationships underlying allied health ESP needs?

RQ4: What are the statistically significant predictors of ESP necessity demand in a multiple regression model that includes instructional lacks, self-competence, and learning preferences as explanatory variables?

2. Literature Review

2.1 Programme-Differentiated ESP Needs: Theoretical Rationale

The theoretical assumption underlying programme-differentiated ESP analysis is the situated conception of language needs, which has been developed by Hutchinson and Waters (1987), who suggested that ESP teaching should be contextualized to the situational contexts of the learners, the particular professional, academic and disciplinary contexts in which the learners will use English. Each programme is a unique target situation in allied health education. The terminology of a physiotherapist is based on the motor assessment report and rehabilitation documentation; the pharmacist is a world of drug information counselling and

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prescription literacy; a medical laboratory technologist is the sphere of written diagnostic reporting; a radiographer is the world of patient positioning instructions and writing of imaging reports; the communicative environment of a nurse is the patient advocacy communication and handing-over clinical information.

Despite the established existence of this theoretical rationality, the empirical ESP studies in the health sciences rarely break down results by programme. Khalili and Tahririan (2020, 2023) studied the undifferentiated group of medical students. Arroyyani et al. (2022) and Danial et al. (2023) targeted only the public health students in Indonesia. Al Amin et al. (2024) compared students with the professionals; however, in the homogenous medical environment. Hekmati et al. (2020) was one such exception as they contrasted students with instructors and practitioners, but their sub-grouping was based on roles, not programmes. The ANOVA on a programme level used in the current study thus bridges an empirical gap which was long suggested by the theoretical framework.

The recent scholarship in the international community has strengthened the demand of the programme-specific differentiation. Aarvidurai et al. (2025) surveyed students in India in their first year of the Allied Health Science network and showed an idea that speaking and listening were seen as the most important skills, with students showing a preference towards online and self-paced learning, which is significantly different based on the task-centered priority of clinical writing among Pakistani DPT and Pharm-D students. On the same note, a mixed-methods study by Al Shamari (2025) on the first-year medical-track students in Saudi Arabia, found that students favoured the General English foundations first then switching to Medical English, but instructors supported the idea of early specialization instead. These comparisons across nations highlight that the demand of ESP necessities is not homogenous even in the general grouping of allied health and that programme-differentiated, context-sensitive analysis is indispensable in a methodology.

2.2 The Curriculum Gap as a Measurable Construct

The idea that there is a disjuncture between modern instruction and the professional communicative requirements is common throughout the ESP needs analysis literature, but it is seldom operationalised as a measurable entity. The conceptualisation of lack by Hutchinson and Waters (1987) is a difference between current proficiency and required proficiency, yet the majority of empirical studies provide lack and necessities in separate tables without calculations of the size of the gap. Khan et al. (2024) obtained moderate scores of current English courses (means 3.54-3.75) and high scores of necessity demand courses (means 3.99-4.01) without obtaining a gap variable. Farea and Singh (2024) also reported the presence of perceptual differences between students and teachers but did not quantify them.

The current work fills this measurement gap by directly operationalising the curriculum gap by Δ = Section D mean - Section B mean (between thematically paired items). The analysis produces a prioritised reform agenda of curriculum designers, by calculating and ranking gap scores in five curriculum domains, which is formally analogous to importance-performance analysis (IPA) as defined by Martilla and James (1977), with minor modifications here to the particular task of ESP curriculum alignment.

This approach is justified based on both Pakistani and international evidence. Lodhi et al. (2018) explored the communicative needs of medical doctors in Pakistan through an ESP lens in the form of a survey and discovered that there was a significant gap between the competencies of the acquired English and desired levels of proficiency - a fact, which the authors explained by the lack of the purpose-oriented English courses. The same study by Buriro et al. (2025) reported that Pakistani undergraduate medical students face a lot of difficulty with English proficiency in the areas of scientific terms and reading fluency, and

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suggested that with more hours on class time, as well as inclusion of ESP-trained instructors, the instructional gap could be reduced. In a model doctoral study of Pakistani medical students in four discourse communities, including, students, teachers, trainees, and administrators Niazi (2012) discovered that the amount of English taught before the medical college was structurally insufficient to support academic and professional demands, which is a structural observation that predicts the gap in the curriculum as operationalised in the current study.

These Pakistani results are reflected in international evidence. Al-Haidari et al. (n.d.) conducted a study on nursing students in the Mahweet City, Yemen, and discovered that the learner reported of having high unmet needs in all the language skills, especially interactive classes and specialised course materials. In a qualitative case study of second-year Algerian medical students, Rebadj (2025) identified a lack of exposure to specialised English and suggested a discipline-specific course design of EAP in order to address the disconnect between general language teaching and field needs. Similar gaps were reported by Akbari (2014), who conducted research on Iranian paramedical students who expressed dissatisfaction with the current ESP courses and saw a lack of technical and semi-technical vocabulary as a key weakness. Taken together, this cross-national evidence confirms the curriculum gap as a structural phenomenon in health sciences English education that is more of a universal than a local issue.

2.3 Correlates and Predictors of ESP Necessity Demand

The discovery of within-student predictors of ESP necessity demand is a relatively under-researched aspect of needs analysis studies in the health sciences ESP, with Khan et al. (2024) reporting a moderate positive correlation between mobile learning readiness and legal English necessity demand ($r = .39$, $p < .001$), meaning that learner-level variables are potent determinants of self-reported ESP needs. Hekmati et al. (2020) discovered that stakeholder role was a predictor of sub-skill prioritisation. Nevertheless, none of the published studies on the Pakistani allied health setting had previously estimated ESP necessity demand using instructional experience, competence, learning preference, and competence simultaneously as predictors before the current study.

There is partial corroborative evidence in the international literature. Al Shamari (2025) established a systematic difference between students and instructors in prioritisation of skills: students placed greater importance on speaking and vocabulary as the fastest way to gain confident, and instructors placed greater importance on foreground writing as the most institutionally challenging skill. This instructor-learner difference in perceived need is a reflection of the type of learner-level diversity that can be clarified by regression modelling. Aarvidurai et al. (2025) discovered that academic and career-oriented motivation to learn English was co-determined, indicating that the need requirement can be multiply determined by cognitive, motivational, and contextual predictors, which is exactly the type of a multivariate structure the regression framework of the current study can capture.

In a needs analysis of first-year medical students in Indonesia, Rinawati et al. (2022) established that 76% of the students spoke English actively during the studies, and reading technical medical articles and writing medical prescriptions were rated as the highest necessity sub-skills. Such a tendency of active language use to predict increased necessity awareness is in line with the competence-need reinforcement dynamic that was observed in the current regression results. Toshtemirovna (2025), based on survey results of 229 students in one university and two colleges in Uzbekistan further supported the notion that medical students found English courses to be necessary yet underprovided, a notion which the intensity of which depended on the prior history of learning English, further indicating within-student predictors.

2.4 Prior English Learning Experience as a Contextual Variable

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Prior English learning experience the perceived quality and sufficiency of English instruction before entering higher education is a key contextual factor in any ESP needs analysis carried out in higher education in developing countries. The quality of teaching English in secondary and higher secondary schools is vastly different in Pakistan depending on the school type (government, private, elite private), region, and socioeconomic background (Ali, 2024). This heterogeneity implies that students who come to GCUF have vastly different English language backgrounds that are likely to influence their assessment of tertiary English teaching, and their perceived professional communicative competence.

Buriro et al. (2025) specifically found pre-university English preparation, as inadequate to medical academic needs, which Niazi (2012) confirmed through a multi-stakeholder Pakistani study that found prior English instruction insufficient to produce the most sought-after productive skills, speaking and writing, in medical professional settings. Akbari (2014) determined that the interviewees requesting more ESP classes were Iranian paramedical students, who believed that they were underprepared linguistically and that this pre-tertiary experience was directly proportional to tertiary need demand. Al-Haidari et al. (n.d.) also reported that the nursing students in Yemen explained their language barriers by insufficient school education.

All these results put the Pearson correlations studied in the current research, between previous experience with learning English and Section B course evaluation ($r = .460$, $p < .001$) and between previous experience and Section C self-competence ($r = .481$, $p < .001$) in context with a long-established international trend: students that entered tertiary education with better English backgrounds are not only more The relatively lesser relationship between previous experience and the necessity demand of Section D ($r = .174$, $p = .002$) is also in line with the global data: necessity demand in ESP is not only motivated by the professional communicative needs of the target situation but rather by the sufficiency of previous schooling.

2.5 Skill Prioritisation and Pedagogical Preferences in Health Sciences ESP

A novel branch of the health sciences ESP literature does not just ask what skills students must have but how they would rather acquire them - a component that is directly related to learning preference as an indicator of necessity demand. Aarvidurai et al. (2025) observed that speaking and listening were the most important to students of allied health science in India and that online, self-paced learning was highly preferred, which was explained by the increased prevalence of digital and flexible learning-based approaches in modern medical education. Al Shamari (2025) discovered that Saudi medical-track students and their teachers agreed with the importance of authentic, communication-oriented teaching methods and task-based interaction, but disagreed on the issues of extensive reading and English-only teaching.

Rinawati et al. (2022) have established that reading technical articles, listening to oral presentations were the highest necessity sub-skills that medical students in Indonesia reported and individual achievement tests were the most desirable form of assessment - a preference profile that differs with the simulation-based and collaborative learning preferences found in GCUF allied health students in the current study. This cross-national difference in learning preferences supports the thesis that the design of ESP courses cannot be wholesale transplanted into institutional and cultural contexts but needs to be sensitive to learner characteristics documented locally.

According to Lodhi et al. (2018), as a Pakistani, the researchers emphasized the importance of conducting workshops in English language, as well as formal courses, as the medical professionals themselves see the worth of interactive and skills-oriented pedagogical tools in comparison with traditional lecturing. Buriro et al. (2025) also suggested the

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incorporation of the latest technological tools and instructors trained in ESP, meaning that the tendency of the Pakistani medical environment is to lean towards the blended approach and the use of technology. Collectively, these preference patterns confirm the positive regression coefficient of learning preferences on ESP necessity demand ($\beta = +.201$, $p = .003$) in the current research and offer theoretical basis in designing interactive and multimodal ESP modules.

2.6 Positioning of the Present Study

The above review comes up with four convergent findings in the international and Pakistani ESP literature on health sciences. First, ESP necessity demand in health sciences is high, near-universal, and consistently underserved by general English instruction across diverse national contexts including Pakistan (Buriro et al., 2025; Niazi, 2012; Lodhi et al., 2018), Iran (Akbari, 2014; Hekmati et al., 2020; Khalili & Tahririan, 2020, 2023), Indonesia (Arroyyani et al., 2022; Danial et al., 2023; Rinawati et al., 2022), India (Aarvidurai et al., 2025), Yemen (Al-Haidari et al., n.d.), Algeria (Rebadj, 2025), Saudi Arabia (ALSHAMARI, 2025), and Uzbekistan (Toshtemirovna, 2025). Second, disaggregation at the programme level is uncommon and most of the literature has assumed health sciences students are a homogenous group in spite of the fact that there is well documented variability in the target communicative situations across programmes. Third, the gap in the curriculum is hardly ever operationalised as a derived and quantified construct; this gap in analysis constrains the implementability of current needs analyses to curriculum designers. Fourth, within-student predictors of necessity demand such as self-competence and learning preferences are not yet researched in regression-based frameworks especially in the Pakistani allied health framework.

The current research deals with the four lacunae at the same time. Through operationalisation of curriculum gap as a domain level measurement, post-hoc comparison of the programmes of the five allied health programmes on the basis of application of the ANOVA and the modelling of the predictors of ESP necessity demand through multiple regression the study enhances not only the methodological rigour but also the policy implications of the needs analysis research in Pakistani allied health English education. Its results are placed to guide differentiated, evidence-based ESP curriculum development at GCUF, and by extension, other allied health faculties in Pakistan.

3. Methodology

3.1 Research Design

The research design used is a secondary analysis in which the data of 309 allied health students at GCUF was analyzed using advanced statistical tools-programme-level ANOVA with post-hoc pairwise comparison, Pearson correlation matrix analysis and ordinary least squares multiple regression. The design is quantitative and analytical, rather than simply descriptive, and spreads the range of inferential inferences of the needs analysis to a level beyond the gender- and semester-level comparisons reported in previous analyses. The analytical design is based on the quantitative ESP needs analysis tradition laid down by Khan et al. (2024) and elaborates it by introducing programme-differentiated and regression-based analyses.

3.2 Participants

The sample comprised N = 309 allied health students at GCUF, drawn from five programmes: DPT (n = 79, 25.6%), Pharm-D (n = 46, 14.9%), MLT (n = 43, 13.9%), RIT (n = 74, 23.9%), and HND/Nursing (n = 38, 12.3%), with a residual group of OTT/other students (n = 29, 9.4%) excluded from programme-level ANOVA to ensure sufficient cell sizes. The structured ESP Needs Analysis Questionnaire based on the Hutchinson and Waters (1987) framework was used to collect data among 3rd, 5th and 7th semester students. All demographic information is given in Table 1.

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3.3 Measures

Four Sections composites were calculated as item-mean scores: Section B (Lacks; 5 items; 0.893), Section C (Professional self-competence; 8 items; 0.921), Section D (ESP necessity demand; 7 items; 0.911) and Section E (Learning preference/Wants; 3 items; 0.774). One variable, A Prior English Learning Experience, was created based on the single Section A item that measured perceived adequacy of prior English instruction (5-point Likert, recoded in such a way that increased scores = increased perceived adequacy). The difference between the curriculums (Δ) was calculated on five conceptually matched domain pairs (paired between Section D and Section B) conceptually.

3.4 Analysis Plan

Analysis was done in four phases: (1) Descriptive statistics and gap scores were calculated on each programme and curriculum domain. (2) One-way ANOVA compared programme groups on demand on Section D necessity, with pairwise independent-samples t-tests to compare post-hoc (significance threshold $p < .05$; Bonferonni adjustment taken into account due to five programmes). (3) Pearson correlation matrix was calculated on all four section composites and bivariate correlations between previous experience in English and section composites were tested. (4) Multiple regression Section D necessity demand was the dependent variable, and Section B (lacks), Section C (self-competence), and Section E (learning preferences/wants) were simultaneous predictors with the standardised coefficients of beta, t-statistic and model R 2.

4. Data Analysis and Findings

4.1 Programme Profiles: Section Composite Means

Table 1 provides the descriptive statistics of the programme level in all the four section composites, previous English learning experience, and the highest priority D8. There are three characteristics of the programme profiles that are noticeable at a glance. First, HND/Nursing students state the highest ESP necessity demand of any programme (Section D: M = 4.47, SD = 0.52) although the students report the lowest self-competence (Section C: M = 3.61) and the lowest course evaluation scores (Section B: M = 3.34) which indicates a notably high need-competence mismatch of the programme. Second, patient communication and counselling were identified as the highest priority ESP area in the D8 checklist of all five programmes, which highlights the universality of this need across the programmes. Third, the means of Section D are significantly greater in MLT and RIT students (4.35 and 4.36 respectively) as compared to DPT students (4.12), which are statistically significant as in Table 4.

Table 1

Programme-Level Descriptive Statistics: Section Composite Means, Prior English Experience, and D8 Top Priority (N = 280)

Programme	n	Sec B M(SD)	Sec C M(SD)	Sec D M(SD)	Sec E M(SD)	Prior Eng. M	D8 Top Priority
DPT	79	3.39 (0.84)	3.76 (0.66)	4.12 (0.66)	3.76 (0.80)	3.73	Patient comm. (63.3%)
Pharm-D	46	3.35 (1.14)	3.77 (0.80)	4.24 (0.71)	3.89 (0.88)	3.57	Patient comm. (67.4%)

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MLT	43	3.78 (0.73)	3.91 (0.51)	4.35 (0.56)	4.02 (0.49)	3.91	Patient comm. (65.1%)
RIT	74	3.56 (0.94)	3.80 (0.87)	4.36 (0.63)	3.88 (0.71)	3.92	Patient comm. (68.9%)
HND/Nursing	38	3.34 (1.08)	3.61 (0.81)	**4.47 (0.52)**	3.75 (0.78)	3.87	Patient comm. (68.4%)
F-statistic	—	F=1.78	F=0.84	**F=2.63***	F=1.00	—	—
p-value	—	.133	.498	**.035***	.407	—	—

*Note. Programme-level n values reflect students in the five focal programmes only. Section composite means computed from Likert items (5-point scale, higher = stronger agreement). F-statistics are from one-way ANOVA across the five programme groups. * p < .05.*

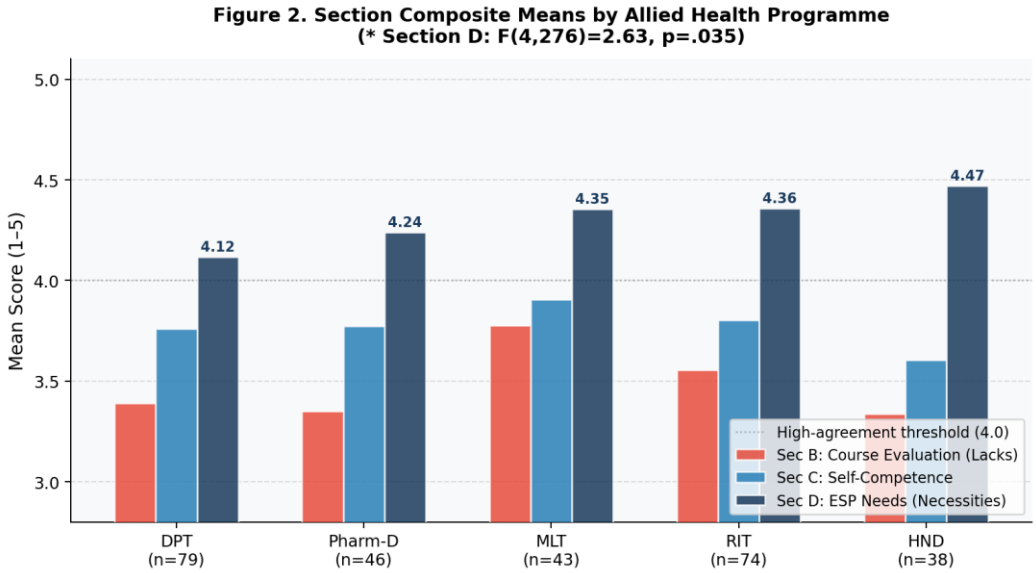

Figure 2. Section Composite Means by Allied Health Programme (Section D: F(4,276) = 2.63, p = .035)*

4.2 The Curriculum Gap: Necessity versus Instructional Lack

The analysis of curriculum gap, i.e., the difference between the requirement of ESP necessity expressed by students (Section D) and the demand of English courses reported by students (Section B) plotted on five thematically parallel curriculum domains is presented in Table 2 and Figures 1 and 8. The average difference between the five domains is Δ = 0.86 score units on the 5-point Likert scale, which is a significant and educationally important gap between the teaching delivery and the professional communicative need.

The greatest difference (Δ = 1.17) is observed in the area of real materials and real-life situations - the work with real healthcare documents (charts, lab reports, case notes) and simulation of clinical interactions. This area is the one that has the largest necessity score of any item in the research (D5: M = 4.38) as well as the lowest instruction adequacy score of any item in Section B (B4: M = 3.21). This convergence establishes the single most urgent curricular gap in the GCUF allied health English programme to be authentic clinical materials.

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The second gap that is the greatest (Δ = 0.89) is the inclusion of clinical writing and practical tasks, then the alignment of medical vocabulary (Δ = 0.81). This multi-domain gap pattern can be visualised by the radar chart in Figure 8, which demonstrates that the necessity polygon always and significantly covers the lacks polygon in all five domains, with the highest protrusion at authentic materials.

Table 2

Curriculum Gap Analysis: Necessity–Lack Difference Scores by Thematic Domain

Thematic Domain	Sec D Mean (Necessity)	Sec B Mean (Current Instruction)	Gap (Δ)	Interpretation
Authentic materials & clinical scenarios	4.38	3.21	**1.17**	Largest gap — highest priority
Clinical writing & practical tasks	4.31	3.42	**0.89**	Large gap — urgent need
Medical vocabulary alignment	4.30	3.50	**0.81**	Substantial gap
Healthcare communication relevance	4.35	3.60	**0.76**	Moderate gap
Assessment & course alignment	4.27	3.59	**0.68**	Moderate gap
Mean Gap (all domains)	**4.32**	**3.46**	**0.86**	**Systemic curriculum deficit**

Note. Gap (Δ) = Section D necessity mean minus the corresponding Section B instructional adequacy mean. Higher Δ values indicate greater curriculum deficit. Means rounded to 2 decimal places.

Figure 1. Necessity-Lack Gap: Comparing Current Instruction (Section B) with ESP Course Demand (Section D) Across Thematic Domains

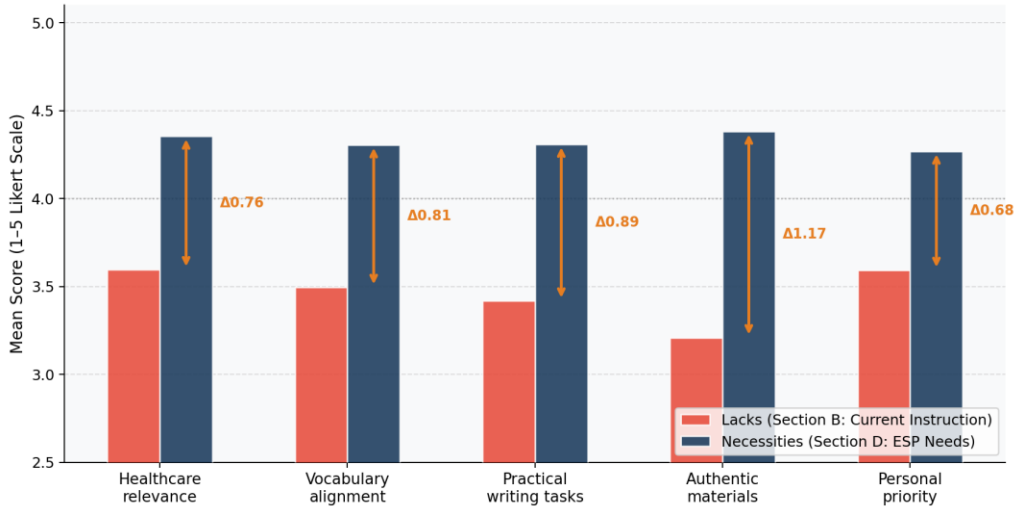

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Figure 1. Necessity–Lack Gap: Comparing Current Instruction (Section B) with ESP Demand (Section D) Across Thematic Domains

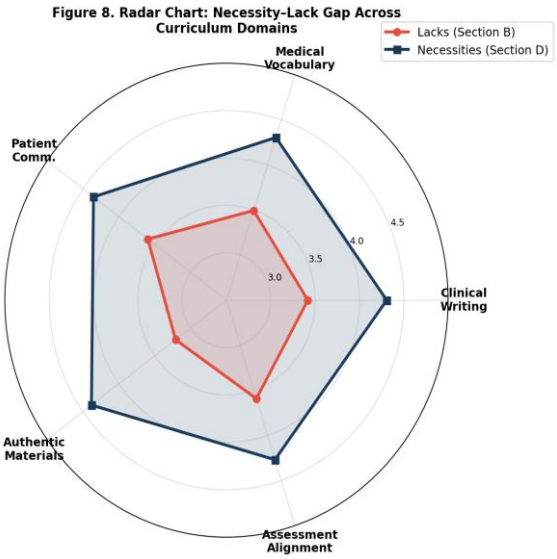

Figure 8. Radar Chart: Necessity–Lack Gap Across Curriculum Domains

4.3 Programme-Level ANOVA and Post-Hoc Analysis: Section D

The one-way ANOVA found that the programme has a significant impact on the necessity demand of Section D ESP in terms of demand (F (4,276) = 2.63, p =.035). Table 3 shows post hoc comparisons. There were two programme contrasts that were statistically significant. The HND/Nursing students noted significantly higher necessity demand in terms of necessity than DPT students (M = 4.47 vs. M = 4.12; t = -2.88, p =.005) and RIT students noted significantly higher necessity demand as compared to DPT students (M = 4.36 vs. M = 4.12; t = -2.29, p The comparison of DPT and MLT came close to the significance value (t = -1.97, p =.052). The rest of the pair-wise comparisons were insignificant.

There is a substantive interpretation of the programme-level difference in Section D. The clinical setting of HND/Nursing and RIT students requires extremely high standards of English-medium interaction with a wide array of stakeholders, such as patients, medical teams, and imaging specialists, early in the training. This group of students then sees the difference between their English training and their professional communicative needs as more pronounced than DPT students who can work in more structured one-on-one rehabilitation settings and have somewhat more predictable communicative needs. Table 4 gives a programme-disaggregated item-level representation of Section D means, indicating that the greater composites scores of HND and RIT students are distributed over numerous items, rather than being caused by an item outlier.

Table 3

Post-Hoc Pairwise Comparisons: Programme Differences on Section D ESP Necessity Demand

Programme A	Programme B	Mean Diff (A−B)	t	p	Significance
DPT (4.12)	RIT (4.36)	−0.24	−2.29	**.024***	**RIT > DPT***
DPT (4.12)	HND (4.47)	−0.35	−2.88	**.005****	**HND > DPT****

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DPT (4.12)	MLT (4.35)	−0.24	−1.97	.052	Borderline ns
Pharm-D (4.24)	HND (4.47)	−0.23	−1.65	.103	ns
MLT (4.35)	RIT (4.36)	−0.00	−0.03	.979	ns (virtually identical)

*Note. Only pairwise comparisons involving DPT are shown; all other pairwise comparisons were non-significant (p > .10). * p < .05; ** p < .01. ns = not significant.*

Table 4

Programme × Item Mean Matrix: Section D ESP Course Needs and Priorities

Programme	D1 Med Writing	D2 Pt Comm.	D3 Vocab	D4 Task-based	D5 Clin. Scen.	D6 Priority	D7 Digital
DPT	4.15	4.15	4.11	4.13	4.24	4.15	3.91
Pharm-D	4.13	4.33	4.28	4.17	4.34	4.35	4.09
MLT	4.33	4.37	4.39	4.34	4.39	4.27	4.39
RIT	4.43	4.43	4.36	4.39	4.40	4.25	4.27
HND	**4.46**	**4.57**	**4.49**	4.38	**4.57**	**4.54**	4.30
Overall	4.31	4.35	4.31	4.27	4.38	4.27	4.18

Note. D1=Medical writing practice; D2=Patient communication training; D3=Field vocabulary; D4=Task-based activities; D5=Clinical scenarios; D6=Personal priority; D7=Digital tools. Bold values indicate the highest programme mean per item column.

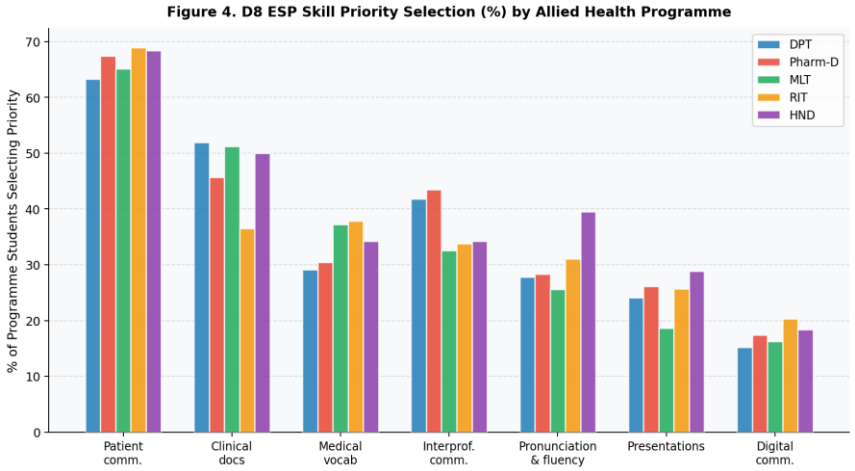

Figure 4. D8 ESP Skill Priority Selection (%) Disaggregated by Allied Health Programme

4.4 Prior English Learning Experience: Distribution and Correlations

Table 5 and Figure 6 provide the information about previous English learning experience of students. Most students reported sufficient prior instruction (Strongly Agree + Agree: 64.7, n = 200), with 27.2% (n = 84) being neutral and 8.1% (n = 25) of students reporting insufficient prior instruction in English. Pearson correlation analysis indicates that the pre-existing experience in English is highly and significantly correlated with the course evaluation

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in Section B (r = .460, p < .001) and with professional self-competence in Section C (r = .481, p < .001). This implies that students who felt that, their previous teaching of English was good, were not only more positive about their tertiary Functional English classes, but also more confident in their professional communicative competence. Interestingly, the correlation between previous English experience and Section D necessity demand, though statistically significant (r =.174, p =.002) is significantly weaker-that is, the need to teach English is not heavily dependent on previous language experience in the students.

Table 5

Prior English Learning Experience: Distribution and Pearson Correlations with Section Composites (N = 305)

Response Category	n	%	Correlation with Sec B	Correlation with Sec C
Strongly Agree (adequate prior instruction)	68	22.0	**r = .460****	**r = .481****
Agree	132	42.7		
Neutral	84	27.2		
Disagree	18	5.8		
Strongly Disagree (inadequate prior instruction)	7	2.3		
Inadequate prior instruction (Disagree + Strongly Disagree)	**25**	**8.1**	p < .001	p < .001

*Note. ** p < .001. Prior English experience scale: 5 = Strongly Agree (adequate instruction) to 1 = Strongly Disagree (inadequate instruction). Correlations computed across all valid responses per variable pair.*

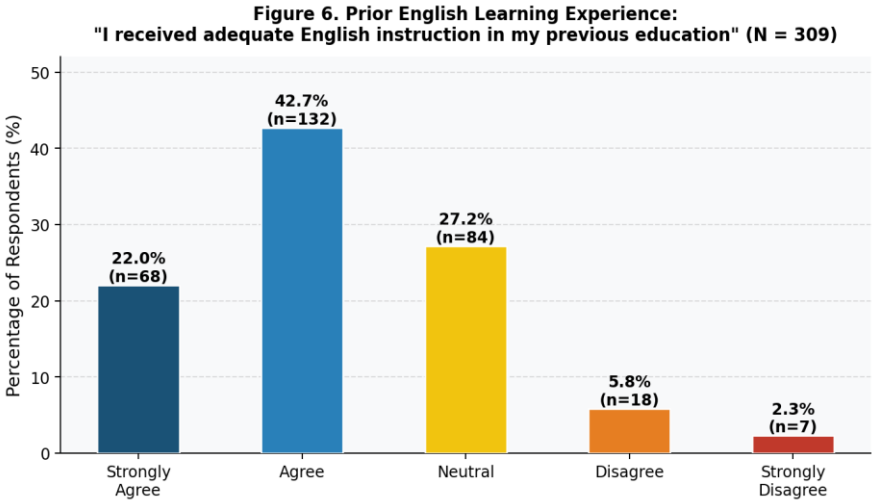

Figure 6. Prior English Learning Experience: Distribution of Student Responses (N = 309)

4.5 Intercorrelation Matrix: The Structural Relationship among Survey Constructs

The Pearson correlation matrix of four section composites is shown in Table 6 and Figure 3. The most noticeable result is that Section B (Lacks) and Section C (self-competence)

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have a strong positive correlation: r =.623 (p <.001). This substantial correlation means that students who rated their Functional English courses more favorably also rated themselves more favorably on self-competence of professional communication- perhaps perceived instructional quality and self-perceived professional readiness are co-varying variables, and may be based on a shared prior experience of English as reported in Section 4.4.

The least strong correlation in the matrix is between the Section B (instructional lacks) and Section D (necessity demand): r =.149 (p=.009). This almost zero correlation is theoretically important: it shows that the assessment of their previous courses in English by students is mostly independent of their perceived need in ESP classes. Students whose rating of their Functional English courses is higher do not demand less the ESP necessity-they demand equally high demand. This autonomy of necessity requirement of instructional satisfaction legitimizes the construct difference between lacks and necessities in the Hutchinson and Waters (1987) model and demonstrates that ESP necessity demand at GCUF is not a simple effect of dissatisfaction but, actually, a professional communicative need.

Section E (learning preferences/Wants) has a moderate correlation with both Section B (r = .387, p < .001) and Section C (r = .526, p < .001), implying that students with better learning preferences also tend to positively evaluate their courses, as well as rate their competence higher- a similar pattern is observed with students exhibiting higher levels of academic engagement in general, who prefer more

Table 6

Pearson Correlation Matrix: Section Composite Intercorrelations (N = 303)

Measure	Sec B (Lacks)	Sec C (Competence)	Sec D (Necessities)	Sec E (Wants)
Sec B: Lacks	1.000	**.623****	.149**	**.387****
Sec C: Self-Competence	**.623****	1.000	.290**	**.526****
Sec D: Necessities	.149**	.290**	1.000	**.324****
Sec E: Wants	**.387****	**.526****	.324**	1.000

*Note. ** p < .001; * p < .01. All correlations are statistically significant at p < .01 or better.*

Figure 3. Pearson Correlation Matrix Among Survey Sections (* p<.01; ** p<.001)

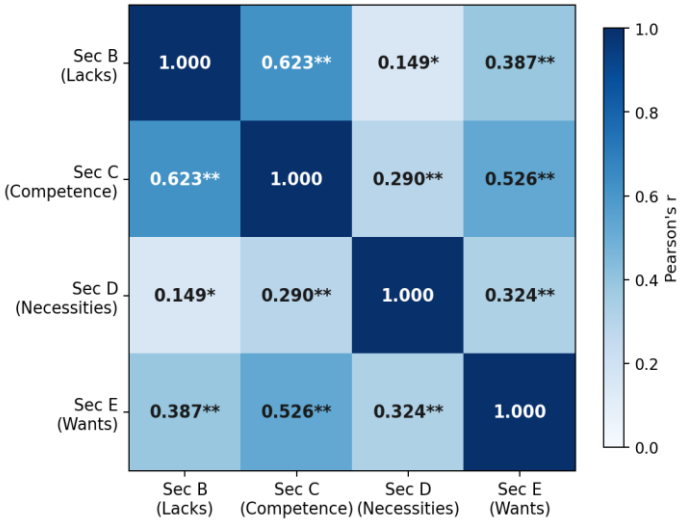

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Figure 3. Pearson Correlation Heatmap Among Survey Section Composites

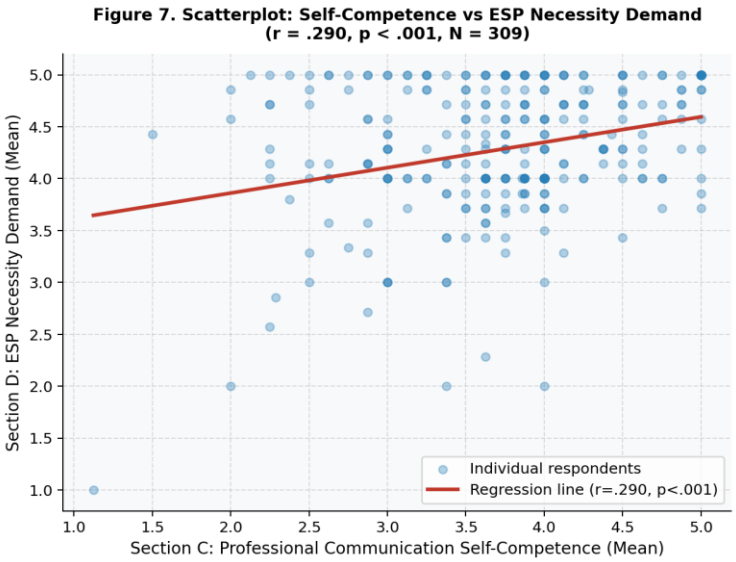

Figure 7. Scatterplot: Professional Self-Competence (Section C) vs ESP Necessity Demand (Section D)

4.6 Multiple Regression: Predictors of ESP Necessity Demand

Table 7 and Figure 5 show findings of the multiple regression analysis where the predictor is Section D ESP necessity demand and simultaneously the predictors Sections B (lacks), C (self-competence), and E (wants/learning preferences) (N = 303). The overall model is statistically significant (F (3,299) = 14.65, p < .001) and explains 12.8% of the variance in ESP necessity demand (R^2 = .128).

There are two predictors that are statistically significant. Section C self-competence (β = +.177, p = =.017) is a positive predictor of necessity demand: students with higher ratings of their professional communication competence also report higher ESP necessity demand. This positive counterintuitive relation, more confident students desire more ESP not less, implies that there is some competence-need reinforcement process at work: an exposure to clinical and professional environments that instill in students a sense of self-competence also increases the awareness of the additional English requirements sets on them by the professional environment. The implication of this finding on curriculum is that, although the provision of ESP is mostly necessary in low-ability students, it is equally necessary and desirable among the students who are already equipping themselves with professional communication skills.

The most significant predictor is section E learning preferences (β =+.201, p =.003): students who have higher preferences towards collaborative, simulation-based, and interactive modalities of learning show higher ESP necessity demand. It follows that the pedagogically interested students, those students most predisposed to the communicative and task-based approach that is suitable to the instruction of ESP, are also the ones most in need of it. Section B (lacks) fails to be significant (β = -.050, p =.420) in the regression model, which is in line with the close-to-zero bivariate correlation (r =.149) above, and further confirms the fact that dissatisfaction with previous instruction is not a major driver of ESP necessity demand.

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Table 7

Multiple Regression: Predictors of ESP Necessity Demand (Section D) (N = 303)

Predictor	β	SE	t	p
Constant	3.024	0.267	11.32	<.001
Section B — Lacks (course evaluation)	−.050	0.062	−0.81	.420
Section C — Professional self-competence	**+.177**	0.074	2.39	**.017***
Section E — Learning preferences (Wants)	**+.201**	0.066	3.05	**.003****
Model: R^2 = .128, F(3,299) = 14.65, p < .001				

*Note. β = standardised regression coefficient. SE = standard error of β. * p < .05; ** p < .01. R^2 = .128 indicates the model explains 12.8% of variance in ESP necessity demand. Collinearity diagnostics confirmed acceptable VIF values (< 3.0) for all predictors.*

Figure 5. Multiple Regression Path Model Predicting ESP Necessity Demand (Section D) from Lacks, Self-Competence, and Learning Preferences (N = 303)

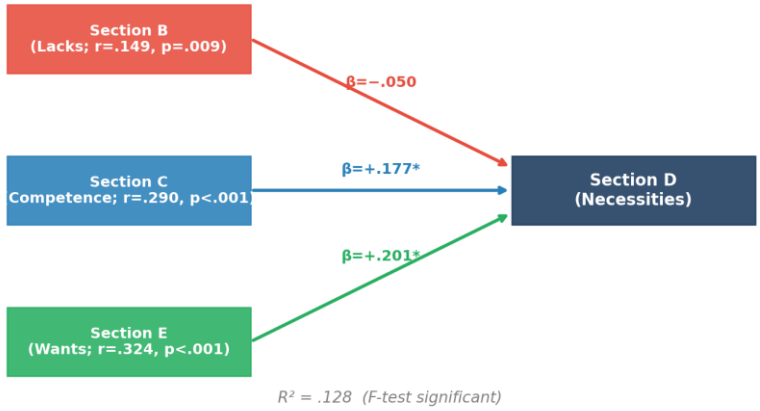

Figure 5. Multiple Regression Path Diagram: Predictors of Section D ESP Necessity Demand

5. Discussion

5.1 The Curriculum Gap as a Policy-Relevant Measurement

The most practically relevant implication of this research is that the gap in the curriculum is quantified in five thematically-based domains. The average difference Δ = 0.86 between the demand of ESP necessity (Section D) and the current instruction adequacy (Section B) is a significant and actionable at the institution level deficit. The difference between a gap of almost one complete unit on a 5-point Likert scale implies that, on average, students perceive their need to receive instruction in ESP almost one category higher than they perceive the adequacy of what they have been taught-a gap that is structurally analogous to a gap in service quality in terms of importance-performance analysis (Martilla and James, 1977).

The rankings of domain-specific gaps give curriculum designers at GCUF the agenda of reforms they should focus on first. The most pressing curricular intervention domain (Δ = 1.17) is the domain which students need (M = 4.38) and do not receive (M = 3.21) instruction with authentic clinical texts: charts, lab reports, case notes, patient records, imaging reports.

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This result is consistent with the existing consensus in the international ESP literature regarding the significance of authentic materials (Danial et al., 2023; Khalili and Tahririan, 2020) but the magnitude of the gap reported here, more than one Likert unit, measures urgency in a manner not previously accomplished by general needs analysis reporting. The top three priorities to be reformed are clinical writing ($\Delta = 0.89$) and medical vocabulary ($\Delta = 0.81$).

The multi-domain gap pattern can be instantly read by the radar chart visualisation (Figure 8). The policymakers and programme coordinators who might not directly work with the raw statistical tables can read the multi-domain gap pattern. The lacks polygon is visualized in the context of the substantially larger necessity polygon, in all five domains, to convey the systemic nature of the curriculum deficit in a single image-a communication strength that the gap quantification has over the typical side-by-side table presentation of most needs analysis studies.

5.2 Programme Differentiation: Why HND/Nursing and RIT Students Demand More

The strong programme effect on the necessity demand under Section D ($F = 2.63$, $p = .035$) with HND/Nursing ($M = 4.47$) and RIT ($M = 4.36$) students indicating much higher demand than the DPT students ($M = 4.12$) has a strong professional sense. The environments of nursing students of GCUF are characterized by the constant communication in English language with an extremely large scope of stakeholders: patients, relatives, physicians, pharmacists, physiotherapists, and institutional administrators. Their communicative burden is possibly the greatest of any allied health programme, incorporating communication with patients, interdisciplinary clinical handover, and comprehensive documentation-all in English. This increased communicative need is evident in the much greater means of HND students on Section D.

The communicative environment of RIT (Radiological Imaging Technology) students is also a different yet equally challenging one: they need to communicate to potentially nervous patients about imaging procedures in an easily digestible language, write radiological reports that are medically accurate, and convey the findings to the requesting physicians. These assignments demand specialised vocabulary, writing competence genre specific and patient communication skills general English instruction has been shown to not develop (D5 for RIT: $M = 4.40$; B4 for RIT: $M = 3.56$, gap = 0.84). The data on the programme-differentiated D8 checklist (Figure 4) further indicate that although patient communication is the top priority in all programmes, DPT students are the only ones to place value on interprofessional communication in conjunction with patient communication (41.8%), which is understandable in the team-based rehabilitation setting of physiotherapy practice.

These programme level differences imply that one standardised allied health ESP course in GCUF, although more advantageous than the existing general Functional English offering, would not address the programme-specific HND, RIT and DPT student communicative requirements. A response to this observation, based on evidence, would be a modular ESP curriculum design: a common core of core knowledge (patient communication, clinical documentation, and medical vocabulary) and programme-specific elective modules of the unique communicative requirements of each allied health profession.

5.3 The Independence of Necessity Demand from Instructional Satisfaction

The fact that the correlation between Section B (instructional lack/course evaluation) and Section D (ESP necessity demand) is almost zero ($r = .149$, $p = .009$) is a theoretically and practically significant result. It shows that the demand at GCUF in ESP necessity is not a proxy of overall dissatisfaction with the teaching of English-students who rate their Functional English courses positively report just as high a demand on the provision of ESP as do the students who rate them negatively. This autonomy confirms the Hutchinson and Waters (1987)

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conceptual difference between lacks (what current instruction fails to deliver) and necessities (what professional situations demand): they are truly separate constructs which do not necessarily correlate with each other in this sample.

The policy implication of this finding is straightforward, namely, to enhance the quality of the general Functional English instruction at GCUF, though this would be a good thing to do, would not be enough to meet the ESP need requirement recorded in this study. ESP is necessary not because the general English courses of students are poor (many of them are rated moderately positively) but because the general English courses are structurally unable to teach them the skills of clinical documentation, medical terminology, and patient communication that the practice of the allied health professional needs. This structural requirement can be fulfilled only by a purpose designed ESP course.

5.4 The Competence-Need Reinforcement Dynamic

The positive regression coefficient of the self-competence as predictor of necessity demand ($p = +.177$, $p = .017$) shows the counter-intuitive yet theoretically significant dynamic students who perceive themselves as more competent in professional communication also perceive a stronger need in ESP instructions. This observation is contrary to a mere deficit theory of ESP motivation the notion that only the incompetent students are interested in language teaching. Rather, it posits a competence-need reinforcement relationship: once students have acquired some professional communication competence, presumably due to clinical exposure and exposure to English-language study materials, they also become more conscious of the additional requirements of their target professional situation on their English abilities.

This has been found to be analogous in other professional education settings. Khan et al. (2024) have recorded a positive correlation ($r = .39$) between mobile learning readiness and legal English proficiency needs among Pakistani law students, indicating that the more students are involved with learning technologies, the more they are also conscious of their English skill gaps. This trend is furthered to the competence dimension by the current finding: pedagogical engagement and professional competence development seem to have a positive but not a negative impact on the awareness of ESP necessity. This suggests to curriculum designers that ESP provision must not be placed as a remedial activity to be offered to low-ability students, but rather as an advanced professional communication development activity to allied health cohort, as a whole.

6. Conclusion

This study has advanced the allied health ESP needs analysis literature in Pakistan by providing three analytical tools (curriculum gap quantification, programme-differentiated ANOVA, multiple regression), that extend beyond the descriptive and basic inferential analyses published in previous studies of this data. The results lead to three key findings.

To begin with, systemic and measurable curriculum gap of 0.86 mean score units is observed between the ESP necessity demands of allied health students at GCUF and the sufficiency of their existing English instruction, with an even larger gap found in authentic materials (0.117) and clinical writing (0.89). This measurement gives curriculum designers a domain-prioritised reform agenda of specificity never before offered in the Pakistani allied health English education literature.

Second, programme issues: The demand of ESP necessity is very much higher among HND/Nursing and RIT students than among DPT students, which is indicative of the particular communicative workload of their prospective professional settings. This observation offers empirical support to a modular ESP curriculum design at GCUF to integrate a universal allied health core with programme-specific instructional tracks.

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Third, instructional dissatisfaction does not affect ESP necessity demand (r = +.149 with Section B) but self-competence (β =+.177) and learning preferences (β = +.201) do. The competence-need interaction in the regression analysis implies that ESP teaching must be established as high-level professional communication training of the entire student population and not as a special need intervention of a low-ability group.

Future studies ought to replicate this programme-differentiated gap analysis in other allied health institutions in Pakistan, examine whether the magnitude of the gap varies by institution type (public vs private) and examine whether the gap in the curriculum can be narrowed by the introduction of modular allied health ESP course as demonstrated by longitudinal post-course evaluation.

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